

**CERCLA parameters for managing Undocumented Subsurface Condition materials
relocated during remedial action implementation at the FMC Operable Unit of the
Eastern Michaud Flats Superfund Site**

December 15, 2015

A. Executive Summary

The management of Undocumented Subsurface Condition (USC) materials encountered during remedial action site-wide grading work at the FMC Operable Unit (OU) is an issue that the CERCLA Area of Contamination (AOC) policy, established under the NCP, is designed to address. This memorandum evaluates the CERCLA parameters for management of these materials and concludes that given the widespread and contiguous contaminated areas at the FMC OU, encompassing the areas where the USC materials were encountered and where they have been re-located, the AOC policy authorizes their management on-site within the CERCLA remedial action. Applying the AOC policy here also is consistent with EPA Region 10 Records of Decisions and supporting evaluations at other CERCLA sites. Those Region 10 decisions, involving contiguous contaminated areas similar to those found at the FMC OU, demonstrate a consistent approach to designating broadly delineated AOCs in the CERCLA context. Further, on-site management of the USC materials is consistent with the remedial action selected in the Interim Amendment to the Record of Decision (IRODA) for the FMC OU (September 2012) and avoids the likely need for generating substantial CERCLA documentation supporting off-site shipment. For these reasons the AOC policy should be utilized in this instance to facilitate on-site USC containment.

B. Background

FMC Corporation (FMC) has encountered Undocumented Subsurface Conditions (USCs) involving elemental phosphorus (P₄)-contaminated materials during the site-wide grading work conducted in 2014 and 2015 as part of the FMC Operable Unit (OU) interim remedial action. By volume almost all the USC materials have been encountered at the slag pile, Remediation Area (RA) F, and in particular at the former slag pile landfill designated RA-F2 that accounts for approximately 68% of the material.

The USC materials largely have consisted of furnace digout and rebuild waste contaminated with P4 from furnace operations. The FMC OU Supplemental Remedial Investigation (SRI) Report (May 2009) documented historic disposal of this type of waste at RA-F2. Tables 1 and 2 of the IRODA summarize the types of fill material within each RA. Table 1 specifically lists “Furnace digout/rebuild” wastes as among the types of wastes known to exist at RA-F2. The IRODA requires FMC to cover RA-F2, along with other RAs that include non-slag fill, with an evapotranspiration (ET) cap. Figure 1 from the IRODA, included as Attachment 1 here, depicts the overall FMC OU and the delineated RAs where capping and other remedial action is required.

Encountering USCs including P4-contaminated material was anticipated at Section 4.3.4 of the *Emergency Response Plan* (ERP, July 2014) that FMC developed as a required deliverable under the June 2013 RD/RA Unilateral Administrative Order (UAO). When USC materials have been encountered, FMC contractors have safely managed them in accordance with the ERP to minimize worker risks.

The figure included here as Attachment 2 depicts the widespread locations where USC materials were identified. Though by volume most of these materials originated at RA-F, approximately 40 of the 217 USC events involved materials at other RAs that originated where they were found. To ensure worker safety and minimize disruption to the site-wide grading work the USC materials typically were relocated to other areas. As of October 30, 2015, the total volume of relocated USC material, not including sand that was added to the material to prevent P4 oxidation, is 860 CY; including sand the total quantity is approximately 1,275 CY.

After consultation with and approval from the EPA Remedial Project Manager (RPM), initially the USC materials and sand (referred to from this point as simply USC materials) were taken to the former coke basins located within RA-A. When the limited capacity of the coke basins was reached, the EPA RPM approved taking the USC materials to a second location, consisting of a levelled and non-engineered area at the former plant landfill designated as RA-F2, located within RA-F. Both of these locations are shown on the annotated FMC OU Remediation Area map that is Attachment 3 here.

Approximately 351 CY of USC materials were taken to the RA-A coke basins. Approximately 509 CY of this material was taken to RA-F2. That volume is not expected to increase as the planned site-wide grading phase and associated excavation and grading of site fill materials, including crushing and screening of slag, was completed on October 30, 2015.

C. CERCLA parameters for management and disposition of the USC materials relocated during the FMC OU interim remedial action

The FMC OU interim remedial action has progressed from site-wide grading to initiation of ET cap construction under EPA-approved work plans and other RD/RA deliverables. Gamma cap construction will commence at IRODA-specified areas, including areas of slag fill, when the needed EPA approvals are in place and site conditions permit. As cap construction commences, it becomes essential to define the long-term management of the relocated USC materials. EPA has suggested that the USC materials at both the RA-A coke basins and RA-F2 should be placed into containers and shipped to an appropriately permitted off-site disposal facility. The following analysis demonstrates that it is entirely consistent with CERCLA parameters to consolidate all the USC material at RA-F2 and cover it with the ET cap that the IRODA specifies for that area.

1. On-site USC material management and disposition promotes IRODA objectives

Consolidation of the USC materials at RA-F2 and protection under an ET cap is not only consistent with but also strongly supported by the IRODA. On-site disposition aligns with basic tenets of the IRODA:

- a. Remediation of P4-containing material on-site rather than excavation and shipment off-site

The IRODA recognizes the safety and environmental risks inherent in excavating, containerizing and shipping P4-contaminated material to an off-site disposal facility. Primarily for this reason, it selected on-site management of this material. The IRODA states at Section 11.5 that “[s]ignificant human health risks arise for remedial workers, workers at nearby facilities, and any emergency responders from excavating, transporting, and treating large volumes of elemental phosphorus-contaminated waste.”

Although this finding was made in the context of evaluating the potential excavation and treatment of P4-contaminated soils that in some FMC OU areas extend to significant depths, it is very much relevant to potential containerization and off-site shipment of the USC material. There would be significant worker risks in often manually placing the USC material into 55-gallon drums, which would be the required shipment container under U.S. Department of Transportation regulations. And the risks to emergency responders and

workers at the receiving disposal facility in handling this P4-contaminated material would be similar to those the IRODA found unacceptable. It is true that the USC material volume is far less than the volume of P4-contaminated soil that the IRODA was addressing. But the duration and degree of worker exposure involved in placing that material into 55-gallon drums would be substantial. Off-site shipment of all the USC material that has been relocated to RA-A and RA-F2 has been estimated to involve 4-6 weeks of preparation work, 35-37 weeks of field work, packaging the material into 4,289 to 4,595 drums, and 63 to 66 truckloads to transport the drums across the country to the TSD facility in Ohio that is the closest facility that has preliminarily indicated that it could accept the material. The same rationale the IRODA found compelling for managing P4-contaminated material on-site also applies to the USC materials.

b. Minimizing risks to worker health and safety from handling even small quantities of P4-contaminated material

While worker risks from handling P4-contaminated material was among the factors cited in the IRODA for selecting on-site management of this material rather than off-site disposal, worker protection was an important IRODA remedy selection factor in its own right. As stated at Section 13.1.12 of the IRODA, “[t]he smoke and gases that were generated and the fires that at times resulted from FMC’s handling of these comparatively small quantities [of P4-contaminated materials], and from FMC operations more generally, posed potentially significant risks to human health.” The “significant risks” to workers from handling even nominal amounts of P4 material was an independent factor leading the IRODA to select a remedy that minimized worker exposure. This same factor leads to selection of on-site disposition of the P4-containing USC material. Selecting off-site disposal would undermine IRODA objectives.

2. The USC materials were encountered and relocated during performance of IRODA-required remedial action

The USC materials that FMC relocated to the coke basins at RA-A and the former plant landfill at RA-F2 were encountered during the performance of site-wide grading that was required under Section 10.2 of the IRODA, the RD/RA UAO, and the EPA-approved *Remedial Action Work Plan for Site-Wide Grading Phase* (September 2014). A major element of the grading work was establishing the design subgrade elevations required for ET and gamma cap placement, including at RA-F and associated RA-F2 where most of the USC material has been encountered. The removal and relocation of USC material was done entirely in the

context of the FMC OU remedial action implementation and within the immediate remediation area, not outside that, and thus CERCLA parameters including allowance for contaminant relocation within the work area apply. This is in contrast to the situation evaluated by *In the Matter of U.S. Department of Energy Hanford Nuclear Reservation, Respondent*, Docket No. RCRA-10-99-0106, 2000 WL 356388 (EPA ALJ, February 9, 2000). In that decision the EPA administrative law judge determined that the CERCLA parameter at issue there, the CERCLA Section 121(e)(1) permit exemption, did not apply to relocation and storage of CERCLA well maintenance hazardous waste within the overall Hanford site but at an entirely separate portion of that site. In contrast, the USC materials were relocated within the remediation area itself and not at some unconnected location.

3. Relocation of materials within the FMC OU is an inherent part of the soil remedial action

The soil remediation required under the IRODA includes construction of extensive ET and gamma caps and FMC OU-wide grading to manage stormwater run-off. This work necessarily involves the movement of substantial amounts of material on-site, including the slope contouring and relocation of materials specified in the *Remedial Action Work Plan for Site-Wide Grading Phase* to establish the required subgrade for cap construction. Thus not only was the USC material encountered and relocated in the course of the required remedial action, its relocation was consistent with the overall large-scale movement of materials including hazardous substances and other contaminants within the FMC OU that is inherent in carrying out IRDOA and RD/RA UAO requirements.

4. Application of CERCLA Area of Contamination parameters to the relocation of USC materials to the RA-A former coke basins and RA-F2 former slag pile landfill area and consolidation of these materials at RA-F2

a. Area of Contamination policy

The USC materials that have been relocated to the former coke basins at RA-A and the area of the former plant landfill at RA-F2 were removed from where they were encountered because they were contaminated with sufficient concentrations of P4 to create worker risks from P4 oxidation and associated burning and smoking. Though its position is that P4-contaminated waste does not exhibit any hazardous characteristic under EPA-prescribed protocols, FMC has agreed to manage generated P4-contaminated material that may burn or smoke as a hazardous waste.

EPA rulemaking associated with promulgation of the CERCLA National Contingency Plan (NCP) at 40 CFR Part 300 in 1990 and subsequent EPA guidance have created guidelines for managing RCRA hazardous wastes that are generated in the course of CERCLA remediation. A succinct statement of this policy is set forth in an EPA guidance memorandum entitled *Management of Remediation Waste Under RCRA*, dated October 14, 1998:

Area of Contamination Policy. In what is typically referred to as the area of contamination (AOC) policy, EPA interprets RCRA to allow certain discrete areas of generally dispersed contamination to be considered RCRA units (usually landfills). Because an AOC is equated to a RCRA land-based unit, consolidation and *in situ* treatment of hazardous waste within the AOC do not create a new point of hazardous waste generation for purposes of RCRA. This interpretation allows wastes to be consolidated or treated *in situ* within an AOC without triggering land disposal restrictions or minimum technology requirements. The AOC interpretation may be applied to any hazardous remediation waste (including non-media wastes) that is in or on the land.

The CERCLA AOC policy was first articulated in the preambles to the 1988 proposed and 1990 final NCP rulemaking, and these rulemaking-associated statements provide the foundation for and most authoritative definition of the policy. The preamble for the final NCP rulemaking in 1990 articulated the policy as follows:

The preamble [for the 1988 proposed NCP rule] also discussed when a CERCLA action constitutes “land disposal,” defined as placement into a land disposal unit under section 3004(k) of RCRA, which triggers several significant requirements, including RCRA land disposal restrictions (LDRs) and closure requirements (when a unit is closed). **It equated an area of contamination (AOC), consisting of continuous contamination of varying amounts and types at a CERCLA site, to a single RCRA land disposal unit**, and stated that movement within the unit does not constitute placement. It also stated that placement occurs when waste is redeposited after treatment in a separate unit (e.g., incinerator or tank), or when waste is moved from one AOC to another. Placement does not occur when waste is consolidated within an AOC, when it is treated *in situ*, or when it is left in place.

55 FR 8666, 8758 (March 8, 1990) (emphasis added).

In contrast to hazardous waste management units at a RCRA facility, CERCLA sites often do not involve discrete waste management units, but rather involve land areas on or in which there can be widespread areas of generally dispersed contamination.

Thus, determining the boundaries of the RCRA land disposal “unit,” for which section 3004(k) would require application of the LDRs at these sites, is not always self-evident.

EPA generally equates the CERCLA area of contamination with a single RCRA land-based unit, usually a landfill. 54 FR 41444 (December 21, 1988). The reason for this is that the RCRA regulatory definition of “landfill” is generally defined to mean a land disposal unit which does not meet the definition of any other land disposal unit, and thus is a general “catchall” regulatory definition for land disposal units. **As a result, a RCRA “landfill” could include a non-discrete land area on or in which there is generally dispersed contamination.** Thus, EPA believes that it is appropriate generally to consider CERCLA areas of contamination as a single RCRA land-based unit, or “landfill.” **However, since the definition of “landfill” would not include discrete, widely separated areas of contamination, the RCRA “unit” would not always encompass an entire CERCLA site.**

55 FR 8666, 8760 (emphasis added).

b. The FMC OU Remediation Areas designated in the IRODA do not establish CERCLA AOC boundaries

During the SRI and Supplemental Feasibility Study (SRI/SFS) process, the FMC OU was divided first into “Remediation Units” and then “Remediation Areas” based on similarities in contiguous area characteristics that warranted evaluation of similar remedial approaches. The IRODA at Section 2.4 adopted this same division of the site because it facilitated the remedy selection analysis and allowed remediation requirements to be defined specifically for each RA.

The RAs establish the boundaries for similar remedial action. They generally do not reflect discrete boundaries of site contamination. As shown on IRODA Figure 1, attached here, all the FMC OU RAs south of Highway 30—encompassing all the RAs where USCs have been encountered, including RA-A and RA-F2 where the USC materials have been relocated—are contiguous. CERCLA remediation is required at all of those RAs. Contaminants, associated risks, and remediation requirements differ, but contamination extends across the boundaries of all the RAs south of Highway 30. The RA designations do not constitute CERCLA AOC boundaries.

- c. EPA criteria support designating all the FMC OU RAs south of Highway 30 as a single CERCLA AOC

As cited above from the preamble to the 1990 NCP final rule regarding delineation of CERCLA AOCs, “since the definition of ‘landfill’ would not include discrete, widely separated areas of contamination, the RCRA ‘unit’ would not always encompass an entire CERCLA site.” Conversely, where contamination is contiguous and neither “discrete” nor “widely separated,” as is the case for the FMC OU RAs south of Highway 30, the affected area consists of a single RCRA “unit” and a single CERCLA AOC. The 1990 NCP preamble text cited above expressly references the possibility that an entire CERCLA site can constitute a CERCLA AOC; by the same token it acknowledges that an AOC can encompass large subareas of a site. These criteria support designating all the RAs south of Highway 30 as a single CERCLA AOC.

The IRODA and the widespread site contamination that spans the RAs reinforce this conclusion. As discussed above, IRODA Figure 1 depicts all the RAs south of Highway 30 as contiguous. Further, IRODA Tables 1 and 2 describe all of these RAs as containing surface or subsurface fill material, further supporting their designation as a single AOC sharing the characteristics of a landfill. Among the types of materials that are distributed widely among the RAs are the USC materials themselves. As shown on the figure included as Attachment 2, these materials originated not only in RA-F but also RA-G, RA-H, RA-C, RA-B, RA-E, and RA-D.

- d. RA-A and RA-F2 where the USC materials have been relocated are in the same CERCLA AOC and those materials can be consolidated at RA-F2

The above factors demonstrate that all the FMC OU RAs south of Highway 30 comprise a single CERCLA AOC. This conclusion is even stronger with respect to the two locations within this area to which the USC materials have been moved—the former coke basins at RA-A and the former slag landfill at RA-F2. These two locations are connected through contiguous RAs, i.e., contiguous contaminated fill areas, all of which are subject to IRODA and RD/RA UAO remedial action requirements. At the completion of the soil interim remedial action, RA-F2 and RA-A and the entire area between them will be covered with either an ET or gamma cap. RA-F2 and RA-A thus are connected by continuous though varying types of contamination, and are neither “discrete” nor “widely separated.”

A further factor connecting these RAs is that both of them, and all the RAs between them, share not only geographic contiguity but also similar types of waste. This includes slag, a remedial action-driving material whose presence triggers an IRODA requirement for placement of a gamma cap as a minimum.

Based on the CERCLA AOC criteria and site-specific factors discussed above, RA-A and RA-F2 are located in the same AOC. RA-F, which encompasses RA-F2, also is located within this same AOC due to the contiguous contamination between them and the additional fact that all contain slag as a significant common contaminant. The movement of USC materials between these areas thus does not constitute RCRA waste generation, and RCRA land disposal restrictions, minimum technological requirements and other RCRA disposal requirements do not apply. Under CERCLA AOC parameters the USC materials relocated to RA-F2 can remain there, and the USC materials currently located at RA-A can be consolidated there, all to be covered with the similar materials already present at RA-F2 with an ET cap.

- e. The USC material receiving area at RA-F2 is not a separate RCRA unit/CERCLA AOC from RA-A, RA-F and the remainder of RA-F2

As discussed above, RA-A, RA-F and its encompassed RA-F2 subarea are in the same CERCLA AOC (as are all the other RAs south of Highway 30). Nothing associated with excavating a level area at RA-F2 for receiving relocated USC material changes that. That receiving area remains, in RCRA terms, a landfill like the rest of the CERCLA AOC in which it is situated. It is intended to function as a permanent repository for the USC material, to be covered with an ET cap, and thus it is not a RCRA waste pile intended for temporary staging of the material. Nor is it an impoundment, land treatment facility, injection well, or any other type of RCRA unit other than a landfill. Thus the USC material receiving area at RA-F2 is fully part of the CERCLA AOC that encompasses it. There are no grounds from excluding it from the CERCLA AOC that as pertinent here includes at a minimum RA-A, RA-F and RA-F2 itself.

- f. EPA Region 10 has categorized or accepted designation of wide areas, including entire sites, as CERCLA AOCs at other Superfund sites

The following are examples of Superfund sites where EPA Region 10 has applied the CERCLA AOC policy broadly within the remedial action context.

- **McCormick and Baxter Creosoting Company Superfund Site, Portland Oregon**

CERCLA remedial action at this site required excavation of soil and other media that, without establishment of a CERCLA AOC, would be considered generated for RCRA purposes when excavated and require management as a listed or characteristic hazardous waste. The March 1996 Record of Decision (ROD) included an extensive discussion of the CERCLA AOC policy and the difficulties of proceeding with remediation without the flexibility that policy would provide. Based on those considerations, the ROD stated at page 53 that “[b]ecause the entire McCormick & Baxter site is contaminated to varying degrees, DEQ [the Oregon Department of Environmental Quality] and EPA have designated the entire site an AOC.”

- **Taylor Lumber and Treating Superfund Site, Sheridan, Oregon**

This site involved primarily pentachlorophenol contamination of the facility soils and groundwater. The September 2005 ROD required groundwater extraction and treatment and soil excavation, consolidation and capping. Both the extracted groundwater and excavated soils were expected to constitute listed or characteristic hazardous waste. The ROD allowed on-site management of these materials under CERCLA AOC principles, avoiding the applicability of RCRA Land Disposal Restrictions or other RCRA requirements to these wastes: “Because the West Facility [which comprised the entire Superfund site] meets the requirements to be an Area of Contamination (AOC), LDRs are not applicable if wastes are consolidated within the AOC, capped in place, or processed within the AOC (but not in a separate unit, such as a tank) to improve its structural stability.”

- **Bunker Hill Mining and Metallurgical Complex Operable Unit 3, Coeur d’Alene River basin, Idaho**

The 2002 EPA ROD for this OU specified that contaminated soils would be removed from residential and some non-residential areas to protect Silver Valley residents from exposure to metals, and stated that the removed soil would be stored in secure repositories. One of those repositories was the East Mission Flats (EMF) Repository. As stated in the East Mission Flats 90% Remedial Design Report, EPA accepted delineation of a broad CERCLA AOC that encompassed the repository location and areas beyond that:

The EMF Repository is located in an area that has existing contamination from deposition of mining waste; therefore, it is considered to be within the Area of Contamination (AOC). The AOC includes source areas of mine and mill sites in the upper South Fork of the Coeur d'Alene River valley, and depositional areas such as the 100-year floodplain in the lower river valley, west of Cataldo, Idaho. Siting repositories in the AOC is an implementation policy of the United States Environmental Protection Agency (USEPA) and Idaho Department of Environmental Quality (IDEQ). The location of EMF is consistent with this policy.

- **Red Devil Mine Site CERCLA removal action, Red Devil, Alaska**

Under its authorized CERCLA authorities, the Department of the Interior Bureau of Land Management supervised contaminated soil removal and stockpiling at this site. The *Red Devil Mine 2005/2006 Contaminated Soil Stockpiling and Debris Removal Report* (June 2007) states the following at page 3:

Under EPA oversight, the BLM has implemented an Area of Contamination (AOC) policy at the Red Devil Mine site. The AOC grants BLM flexibility in managing mine wastes without prompting EPA land disposal restrictions. The AOC encompasses the portion of the mine to the east of Red Devil Creek and includes the former retort building.

- **Northwest Pipe and Casing Company/ Hall Process Company Soil Operable Unit (OU 1), Clackamas County, Oregon**

The June 2000 EPA ROD for this OU addressed remediation of contaminated soil and debris at the site. Pipe coating operations at the facility used coal tar, polyethylene epoxy and other coating materials that resulted in soil and groundwater contamination at the 53-acre facility. Most of the pipe coating operation took place at a 32-acre portion of the facility known as Parcel B, where various pipe manufacturing and coating operations took place. EPA designated that entire, heterogeneous Parcel as a CERCLA AOC:

This ROD establishes an Area of Contamination (AOC) for VOC-contaminated soil, which encompasses Parcel B. Pursuant to EPA policy, because an AOC is equated to a RCRA land-based unit, consolidation and *in-situ* treatment of hazardous waste within the AOC do not create a new point of hazardous waste generation for purposes of RCRA. Therefore, soil within the AOC may be consolidated or treated *in-situ* without triggering RCRA land disposal restrictions (LDRs) or minimum technology requirements.

5. Needed EPA documentation regarding selected approach for USC material disposition

Section XXVI of the June 2013 RD/RA UAO and the EPA On-Scene Coordinator authorities specified at 40 CFR §300.120 provide EPA with the authority to approve and require consolidating at RA-F2 the USC material relocated there and at RA-A, to be covered under the ET cap that the IRODA specifies for RA-F2. Because this would be consistent with the on-site soil consolidation and remediation that the IRODA selected, this would be a “nonsignificant” change to the IRODA under the applicable NCP criteria specified at 55 FR 8666, 8772 (March 8, 1990) and could be documented in a directive issued to FMC.

In contrast, directing that part of all of the relocated USC material must be placed into containers and shipped to an off-site treatment and disposal facility would vary significantly from the on-site remediation approach selected by the IRODA. Such an EPA decision likely would require preparation of an Explanation of Significant Differences document (ESD), under the guidelines specified in EPA’s *Guide to Preparing Superfund Proposed Plans, Records of Decision, and other Remedy Selection Decision Documents* (OSWER 9200.1 23P, July 1999).

D. Conclusion

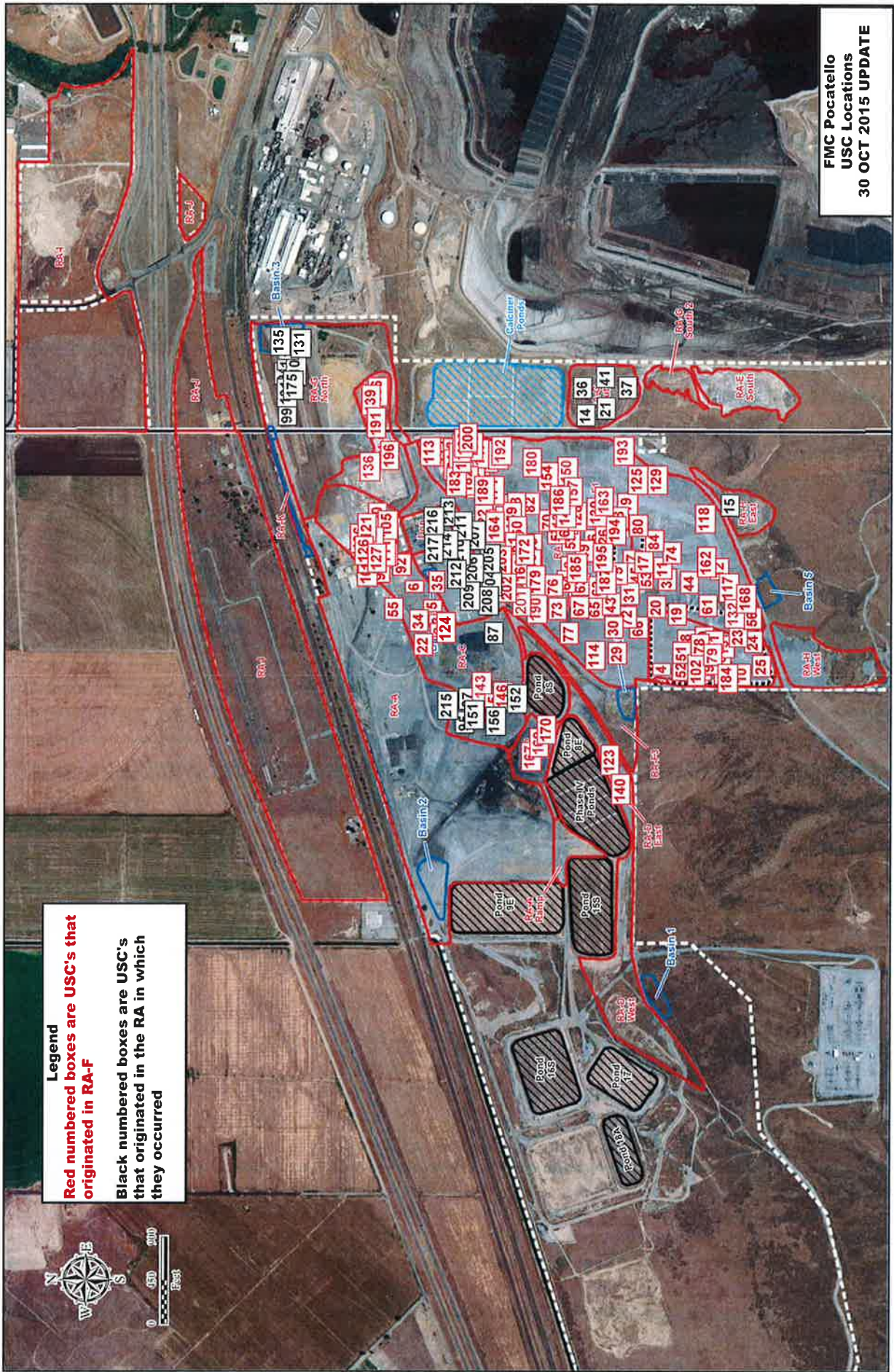
Consolidating at RA-F2 the USC material taken to RA-A and RA-F2 and addressing that in the on-site CERCLA remediation can and should be the course of action here, for the following reasons:

- It promotes the IRODA objective of managing P4-contaminated material on-site within the FMC OU
- It promotes the IRODA objective of protecting the health and safety of remediation workers, first responders, workers at potential treatment and disposal facilities, and the general public along transportation routes if the materials were shipped off-site
- It is consistent with the CERCLA AOC policy, as articulated in the NCP rulemaking and EPA guidance and as applied in practice by EPA Region 10 at other CERCLA sites.

Attachment 1



Attachment 2



FMC Pocatello
USC Locations
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Attachment 3

